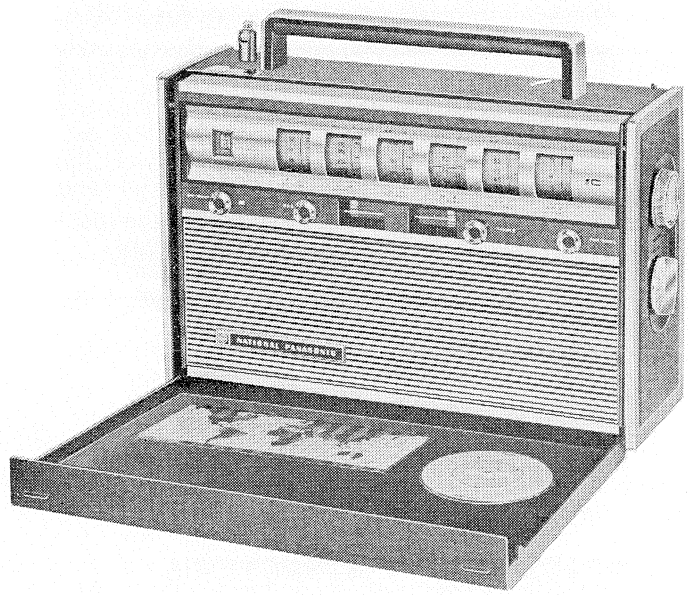
ORDER NO. RD-483

NATIONAL PANASONIC

Service Manual

FM/AM 6-BAND 30 SOLID STATE DEVICES INCORPORATING ICs (INTEGRATED CIRCUITS)

MODEL RF-3000



SPECIFICATIONS

Frequency Range:	FM 87~ 108 Mc/s LW 150~ 400 kc/s (2000~750m) AM 520~1610 kc/s (577 ~ 186m) MB 1. 6~ 4.5 Mc/s (187~66.7 m) SW_1 4. 5~ 12 Mc/s (66.7 ~ 25 m) SW_2 12 ~ 22 Mc/s (25 ~ 13.6 m)
Intermediate Frequency:	FM 10.7 Mc/s AM 455 kc/s
Integrated Circuits:	EXM-0515XA AM IF Amplifier EXM-0515XB AM Detector & AGC
Transistors:	2SC429 FM RF Amplifier 2SC469 FM Mixer 2SC185 FM Oscillator 2SC469 FM 1st IF Amplifier 2SC469 FM 2nd IF Amplifier 2SC469 FM 3rd IF Amplifier 2SC469 FM 4th IF Amplifier 2SC185 AM RF Amplifier 2SC185 AM Converter 2SC183 Regulator Amplifier 2SB176 Regulator 2SB173 1st AF Amplifier 2SB173 2nd AF Amplifier 2SB171 3rd AF Amplifier 2SB175 4th AF Amplifier 2SB324 } Power Amplifier (push-pull) 2SB324 }
Diodes:	SC-15 FM AFC OA70 FM AGC OA79 } FM Detector OA79 } 1S1211 } Operation Compensator 1S1211 } 1S1211 } Operation Compensator 1S1211 } OA70 AM D. AGC
Sensitivity:	FM 0.5μV for 50mW Output LW 150μV/m for 50mW Output AM 50μV/m for 50mW Output MB 30μV/m for 50mW Output SW_1 30μV/m for 50mW Output SW_2 30μV/m for 50mW Output
Power Output:	1.2W Undistorted 2W Maximum
Power Source:	9V (Six "D" Size Flashlight Batteries) (NATIONAL UM-1 or equivalent)
Speakers:	12cm(5") plus 10cm(4") PM Dynamic Speaker
Cabinet Dimensions:	370(Wide)×254(High)×129(Deep)mm (14 9/16"×10"×5 1/4")
Weight:	5.6 kg. (12 lb. 6 oz.)

<EXPORT DIVISION>
MATSUSHITA ELECTRIC TRADING CO., LTD.
P. O. Box 288, Central Osaka, Japan

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD,
RADIO DIVISION

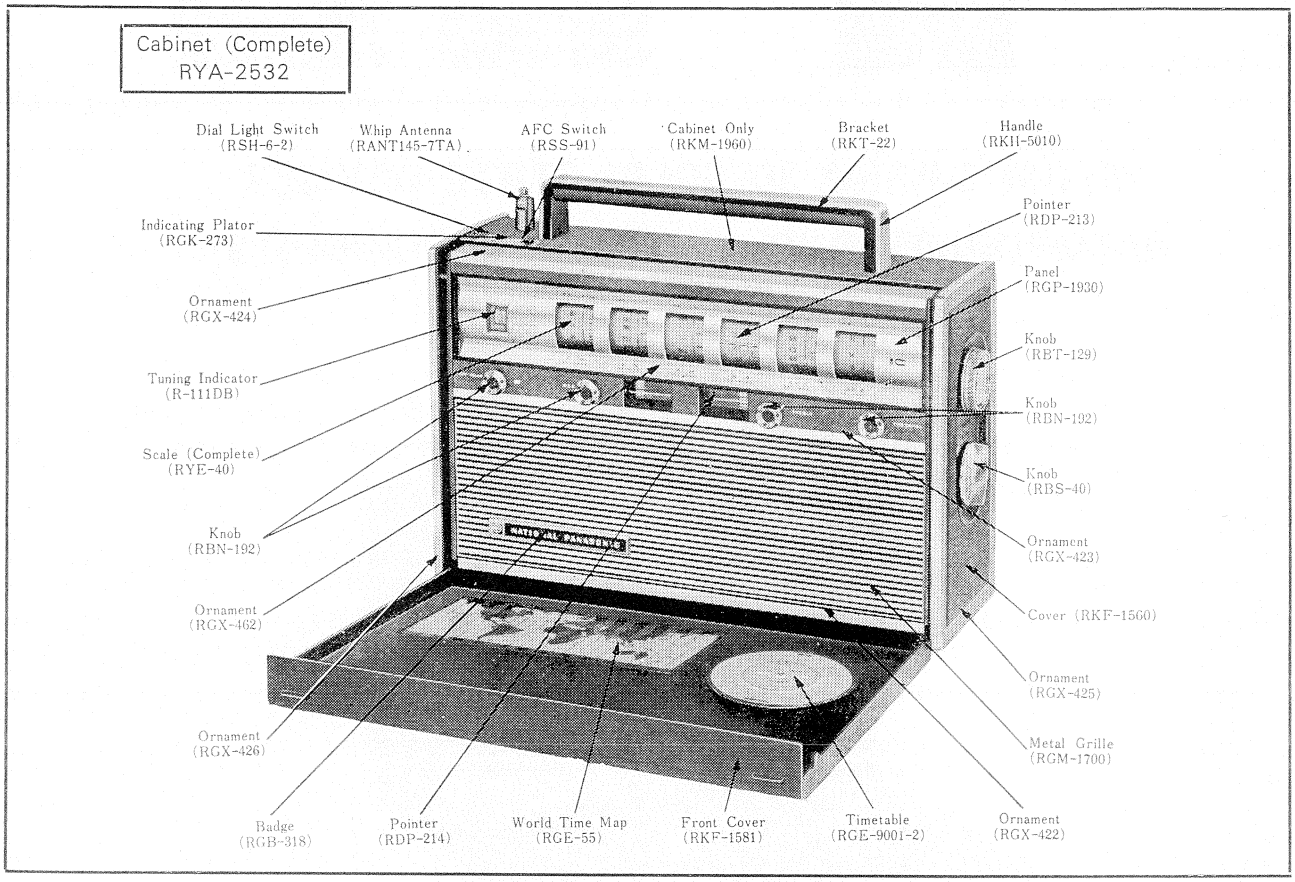
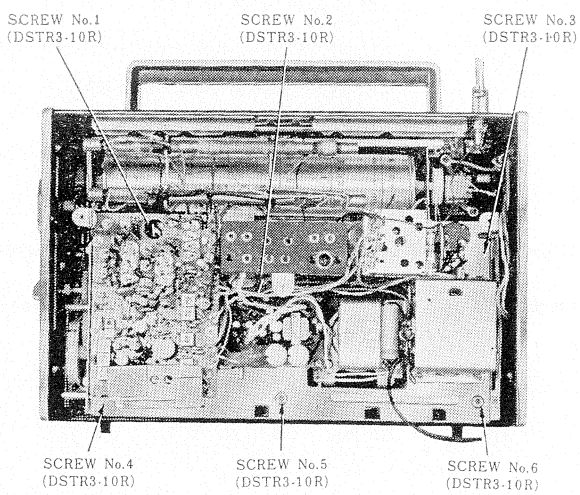


Fig. 1 Cabinet & Appearance - Parts Identification.

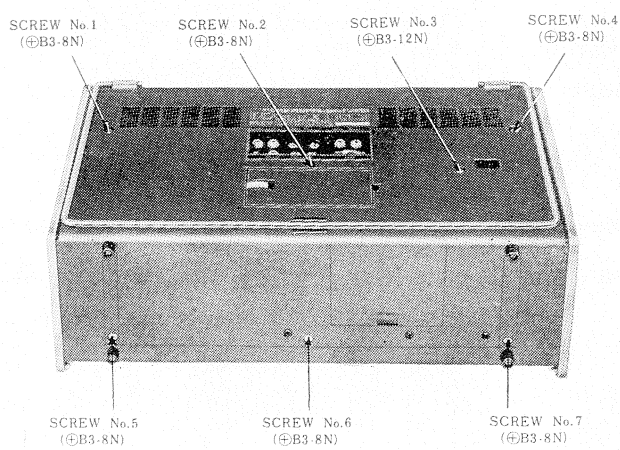
DISASSEMBLY INSTRUCTIONS

To Remove Chassis (Refer to Fig. 2 & 3)

1. Remove six (6) control knobs from cabinet.
2. Remove seven (7) cabinet back cover mounting screws, Nos. 1~7, as illustrated in Fig. 2.
3. Pull out plugs.
4. Remove six (6) red chassis mounting screws, Nos. 1~6, as illustrated in Fig. 3.
5. To remove chassis completely, unsolder leadwires to speaker and ground terminals, and remove AFC switch, dial light switch and tuning indicator from cabinet.
6. To reassemble, reverse the above procedure.



(Fig. 2)



(Fig. 3)

Figs. 2 & 3 Disassembly Points.

To Remove Dial Scale (Refer to Fig. 4)

1. Remove the chassis from the case (Refer to Figs. 2 & 3).
2. Remove two (2) dial drum mounting screws.
3. Remove four (4) dial scale bracket mounting screws, Nos. 1~4, as illustrated in Fig. 4.
4. To reassemble, reverse the above procedure paying attention to the following:
   Mount dial drum at an angle of 45° and start dial cord stringing after setting starting point of the dial scale as illustrated in Fig. 5.

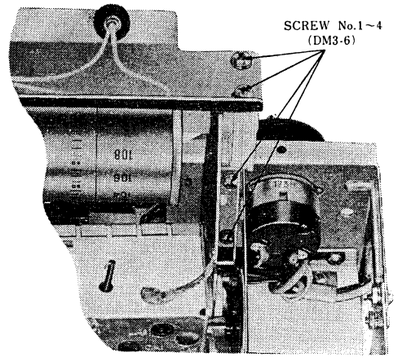


Fig. 4

To Mount Fine Tuning Knob

1. Set the slot of fine tuning control horizontally.
2. Set the protuberance of the fine tuning knob to white making of the cabinet.
3. Insert fine tuning knob to its shaft.

CORD STRINGING GUIDE

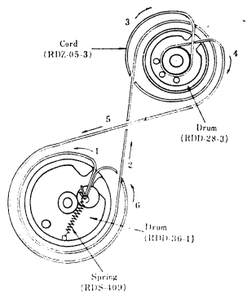


Fig. 5

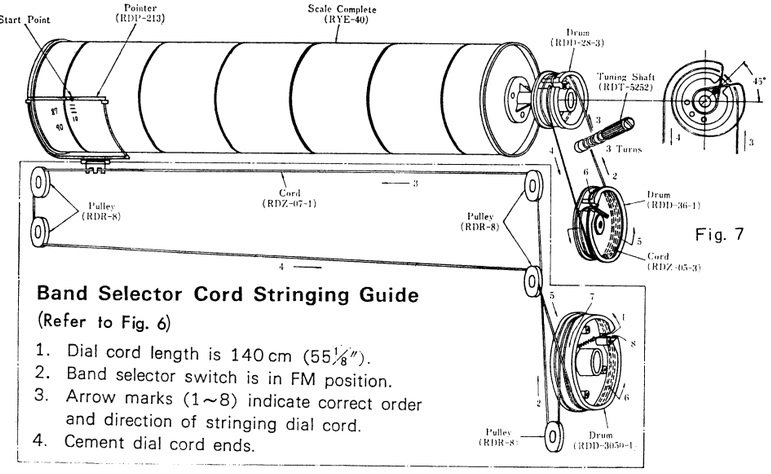


Fig. 7

Band Selector Cord Stringing Guide
(Refer to Fig. 6)

1. Dial cord length is 140 cm (55⅛″).
2. Band selector switch is in FM position.
3. Arrow marks (1~8) indicate correct order and direction of stringing dial cord.
4. Cement dial cord ends.

Fig. 6

FM Dial Cord Stringing Guide
(Refer to Fig. 5)

1. Dial cord length is 65cm (25 19/32″).
2. Tuning gang is positioned at maximum capacity.
3. Dial scale is positioned at start point.
4. Arrow marks (1~6) indicate correct order and direction of stringing dial cord.
5. Cement dial cord ends.

AM Dial Cord Stringing Guide
(Refer to Fig. 7)

1. Dial cord length is 65cm (25 19/32″).
2. Tuning gang is positioned at maximum capacity.
3. Band selector switch is in FM position.
4. Dial scale is positioned at start point.
5. Arrow marks (1~6) indicate correct order and direction of stringing dial cord.
6. Cement dial cord ends.

Tone Indicator Cord Stringing Guide (Refer to Fig. 8)

1. Dial cord length is 60cm (23⅝″).
2. Set tone control fully clockwise.
3. Fasten one end of the dial cord to the spring and attach the other end of the tension spring to the chassis hole. Then start stringing in numerical order.
4. Cement dial cord ends.

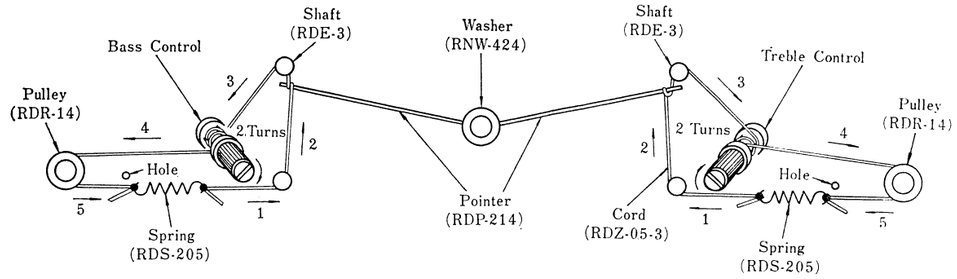


Fig. 8

ALIGNMENT INSTRUCTIONS

VOLTAGE ADJUSTMENT

1. Radio Receiver Setting
   - Set tuning gang to non-interference point (on/about 550 kc/s).
   - Set band selector switch to AM.
2. Circuit Tester Connection
   - Set a circuit tester to 10 volts and connect the positive side to the test point "TP4", and the negative side to chassis,
3. Voltage Indication
   - Adjust the 1KΩ potentiometer (R_{65}) so that the circuit tester indicates 5V.

TUNING INDICATOR ADJUSTMENT

1. Radio Receiver Setting
   - Set band selector switch to AM or FM
   - Set tuning gang to non-interference point (on/about 550 kc/s).
2. Remarks
   Adjust 1KΩ potentiometer (R_{43}) & 20KΩ potentiometer (R_{35}) so that the pointer of the tuning indicator stays as shown in Fig. 9.

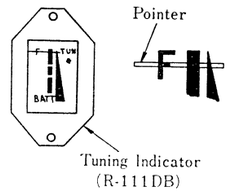


Fig. 9

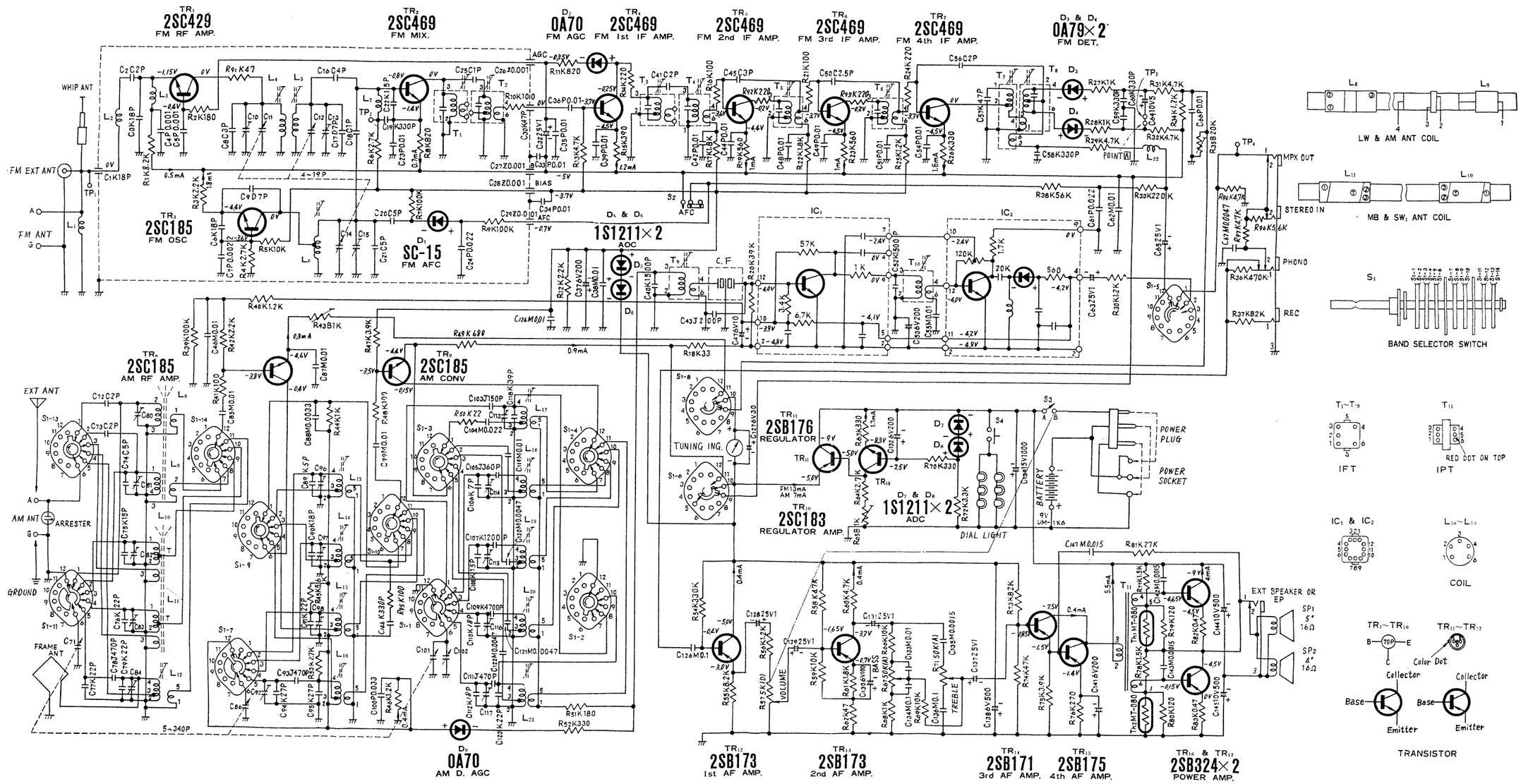
Notes:

1. Refer to Figs. 15 and 16 for alignment points.
2. Stand the frame antenna on top of the cabinet when aligning SW_1~SW_2 bands. Because the frame antenna is attached to the cabinet, do not pull out its plug.

AM IF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set volume control to minimum. Set bass control to fully clockwise.
Set power source voltage to 9 volts DC. Set treble control to fully clockwise.
Set fine tuning control to center.

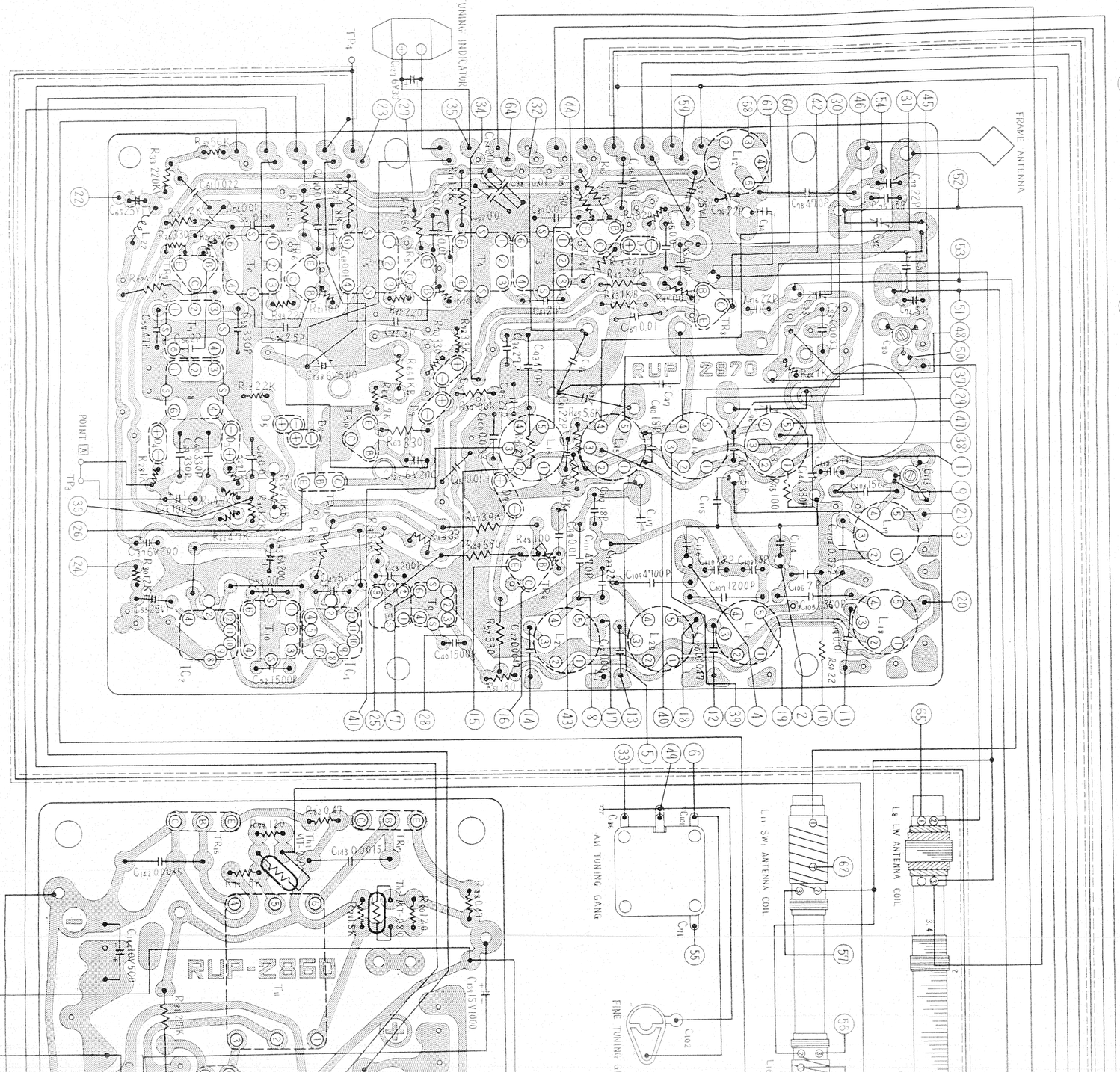
	Band Switch Position	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
1	AM	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455 kc/s (400~ Mod.)	Point of non-interference (on/about 550 kc/s)	Output meter across voice coil	T_9 (1st IFT) T_{10} (2nd IFT)	Adjust for maximum output.

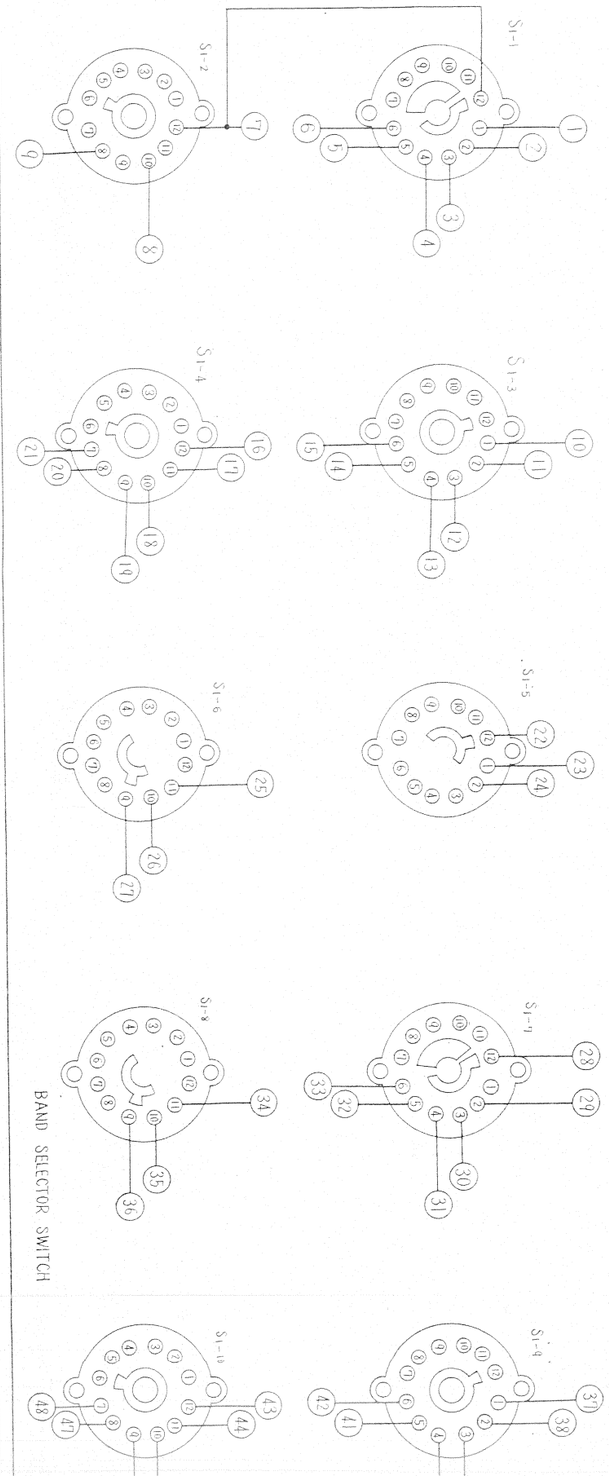


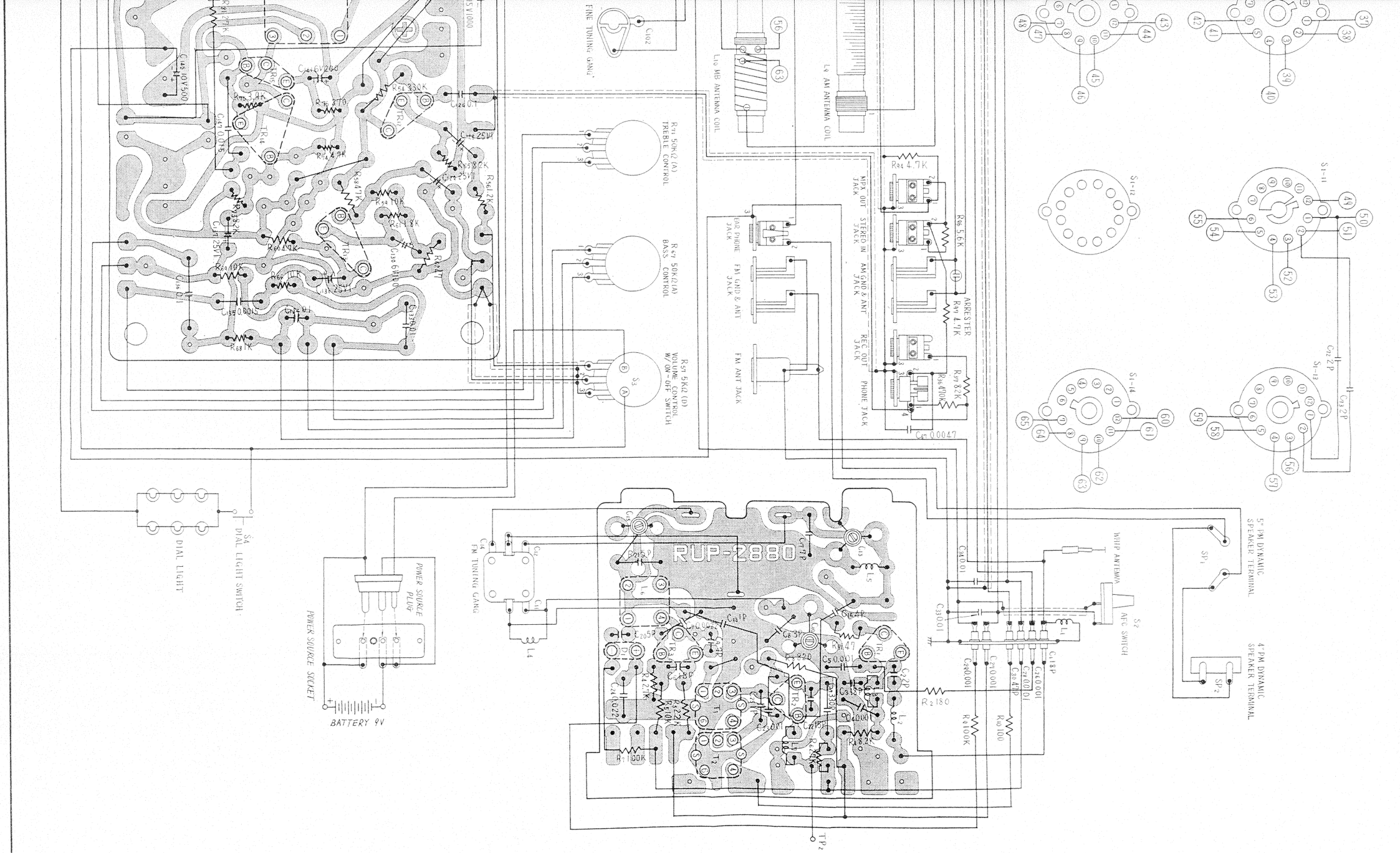
Notes :

1. S_{1-1}～S_{1-14} : Band selector switch in "FM" position.
2. S_2 : AFC switch in "ON" position.
3. S_3 : Power source switch in "OFF" position.
4. S_4 : Dial light switch in "OFF" position.
5. DC Voltage measurements are taken with circuit tester 10KΩ/volt from chassis ground.
   TR_1～TR_7.....Band selector switch in FM position.
   TR_8, TR_9.....Band selector switch in AM position.
6. Capital letters (J,K,M,P,C,D) in the circuit diagram show allowable tolerances of resistors and capacitors as follows:
   J=±5% K=±10% M=±20% P=+100% − 0%
   C=±0.25PF D=±0.5PF
7. PF=pico farad=mmf
   μF=micro farad=MF
8. All resistor values in ohms (K=1000Ω).
9. All capacitor values in micro farads (P=μμF).

Fig. 10 Schematic Diagram.


TUNING INDICATOR
FRAME ANTENNA
POINT (A)
RUP-2860
2SJ 2870
AM TUNING GANG
FINE TUNING
L1 SW1 ANTENNA COIL
L8 LW ANTENNA COIL


BAND SELECTOR SWITCH
S1-1
S1-2
S1-3
S1-4
S1-5
S1-6
S1-7
S1-8
S1-9
S1-10



Notes:

1. All resistor values in ohms (K=1000Ω).
2. All capacitor values in micro farads (P=$\mu\mu$F).

Fig. 11 Circuit Board Wiring View (Conductor Side).

AM RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set volume control to maximum. Set fine tuning control to center.
Set bass control to fully clockwise. Set power source voltage to 9 volts DC.
Set treble control to fully clockwise.

	Band Switch Position	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
1	LW	Fashion loop of several turns of wire and radiate signal into loop of receiver.	150 kc/s (400~ Mod.)	150 kc/s	Output meter across voice coil.	L_{17} (OSC Coil) L_8 (ANT Coil)	Adjust for maximum output by sliding coil (L_8) along ferrite core.
2		〃	400 kc/s (400~ Mod.)	400 kc/s	〃	C_{113}(OSC Trimmer) C_{80} (ANT Trimmer)	Adjust for maximum output. Repeat steps (1) and (2).
3	AM	〃	550 kc/s (400~ Mod.)	550 kc/s	〃	L_{18} (OSC Coil) L_9 (ANT Coil) L_{13} (DET Coil)	Adjust for maximum output by sliding coil (L_9) along ferrite core.
4		〃	1500 kc/s (400~ Mod.)	1500 kc/s	〃	C_{114}(OSC Trimmer) C_{81} (ANT Trimmer) C_{96} (DET Trimmer)	Adjust for maximum output. Repeat steps (3) and (4).
5	MB	〃	1.6 Mc/s (400~ Mod.)	1.6 Mc/s	〃	L_{19} (OSC Coil) L_{10} (ANT Coil) L_{14} (DET Coil)	Adjust for maximum output by sliding coil (L_{10}) along ferrite core.
6		〃	4.5 Mc/s (400~ Mod.)	4.5 Mc/s	〃	C_{115}(OSC Trimmer) C_{97} (ANT Trimmer) C_{82} (DET Trimmer)	Adjust for maximum output. Repeat steps (5) and (6).
7	SW_1	〃	4.5 Mc/s (400~ Mod.)	4.5 Mc/s	〃	L_{20} (OSC Coil) L_{11} (ANT Coil) L_{15} (DET Coil)	Adjust for maximum output by sliding coil (L_{11}) along ferrite core.
8		〃	12 Mc/s (400~ Mod.)	12 Mc/s	〃	C_{116}(OSC Trimmer) C_{83} (ANT Trimmer) C_{98} (DET Trimmer)	Adjust for maximum output. Repeat steps (7) and (8).
9	SW_2	Stand frame antenna and radiate signal a to frame antenna.	12 Mc/s (400~ Mod.)	12 Mc/s	〃	L_{21} (OSC Coil) L_{12} (ANT Coil) L_{16} (DET Coil)	Adjust for maximum output.
10		〃	22 Mc/s (400~ Mod.)	22 Mc/s	〃	C_{117}(OSC Trimmer) C_{84} (ANT Trimmer) C_{92} (DET Trimmer)	Adjust for maximum output. Repeat steps (9) and (10).

Note: Cement antenna bobbin with wax after completing alignment.

FM IF & DETECTOR ALIGNMENT WITH OSCILLOSCOPE

OSCILLOSCOPE

Set sweep selector of oscilloscope to "External Sweep". Apply 60~ sweep signal from sweep generator to horizontal input terminals of oscilloscope.

EQUIPMENT REQUIRED

Signal generator that provides 10.7 Mc/s marker.
Sweep generator that provides 10.7 Mc/s center frequency and 400 kc/s sweep width.
Set band selector switch to FM. Set bass control to fully clockwise.
Set volume control to minimum. Set treble control to fully clockwise.
Set power source voltage to 9 volts DC. Set fine tuning control to center.

	SWEEP GENERATOR COUPLING	SIGNAL GENERATOR COUPLING	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
1	High side thru. .001μF to point **TP_2**. Common to chassis.	High side thru. .001μF to point **TP_2**. Common to chassis.	Point of non-interference (on/about 100 Mc/s)	Connect vert. Amp. of scope to point **TP_3**. Common to chassis.	T_1 (FM 1st IFT)(P) T_2 (FM 1st IFT)(S) T_3 (FM 2nd IFT)(P) T_4 (FM 2nd IFT)(S) T_5 (FM 3rd IFT) T_6 (FM 4th IFT)	Adjust for maximum amplitude and symmetrical curve. (Refer to Fig.12)
2	〃	〃	〃	Connect vert. Amp. of scope to point **TP_4**. Common to chassis.	T_6 (FM 5th IFT) (Primary) T_8 (FM 5th IFT) (Secondary)	Adjust **T_7** for maximum amplitude & proper linearity between ±100 kc/s markers. Adjust T_8 so that 10.7Mc/s marker appears at the center. (Refer to Fig. 13)

Note: When aligning the Ratio Detector circuit, the wave form may appear as in Fig. 12 & 13 or upside-down.

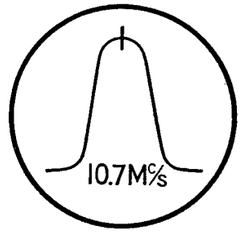


Fig. 12

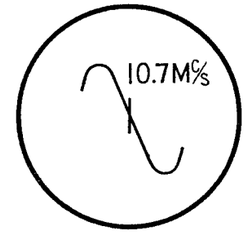


Fig. 13

FM RF ALIGNMENT

Output of signal generator should be no higher than necessary to obtain an output reading.
Set volume control to maximum. Set bass control to fully clockwise.
Set band selector switch to FM. Set treble control to fully clockwise.
Set power source voltage to 9 volts DC. Set fine tuning control to center.

	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
3	Connect to Point **TP_1** through FM Dummy antenna. Common to chassis. (Refer to Fig. 14)	90 Mc/s (400~ Mod.)	90 Mc/s	Output meter across voice coil.	L_6 (FM OSC Coil) L_5 (FM DET Coil) L_4 (FM Collector Coil)	Adjust for maximum output.
4	〃	106 Mc/s (400~ Mod.)	106 Mc/s	〃	C_{15}(FM OSC Trimmer) C_{13}(FM DET Trimmer) C_{10}(FM Collector Trimmer)	Adjust for maximum output. Repeat steps (3)and (4).

Note: As three output responses will be present, proper tuning is the center frequency.

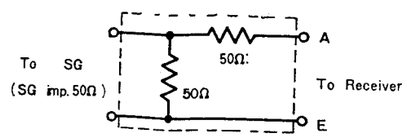
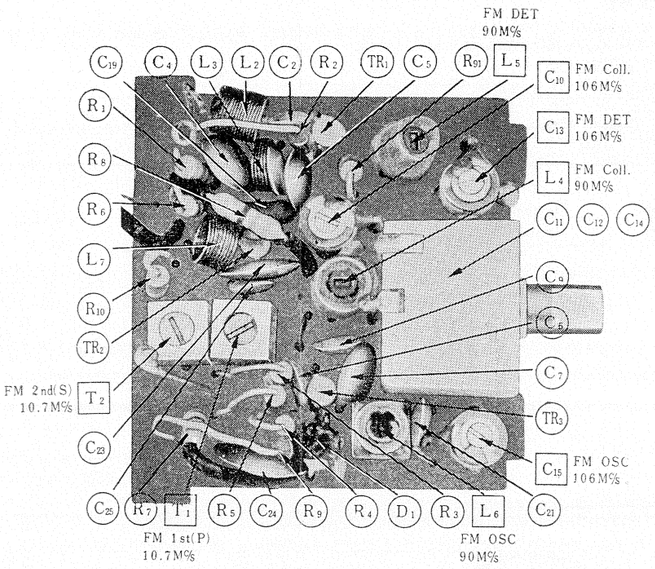
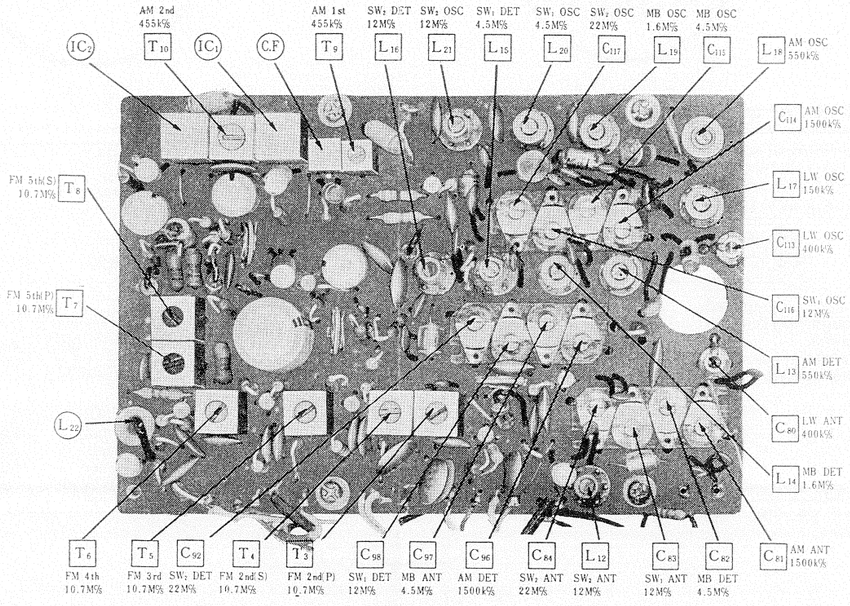


Fig. 14 FM Dummy Antenna



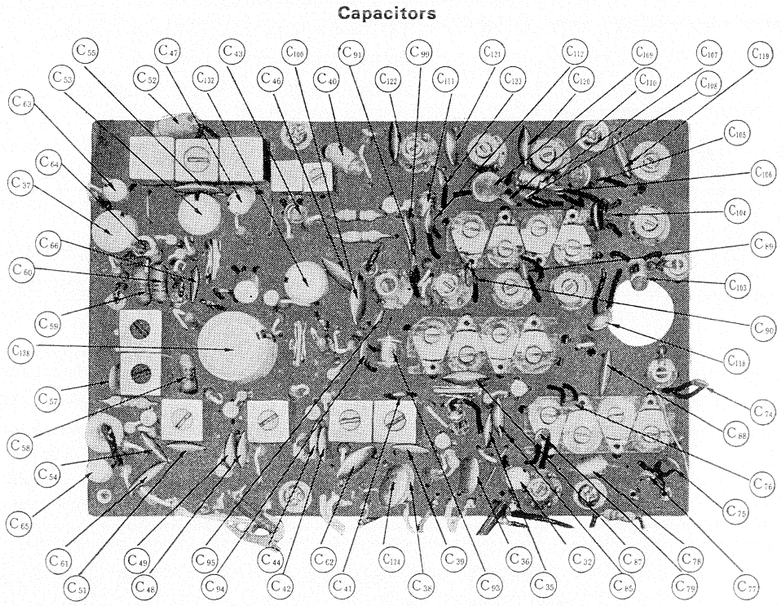
(FM RF Section)

Fig. 15 Component View - Parts Identification, Alignment Points.



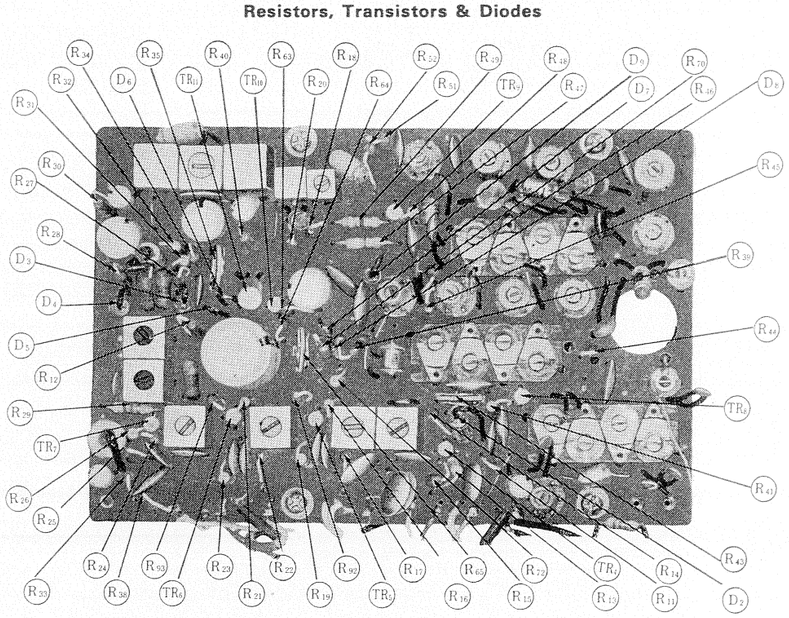
(IF Section)

Fig. 16 Component View - Parts Identification, Alignment Points.



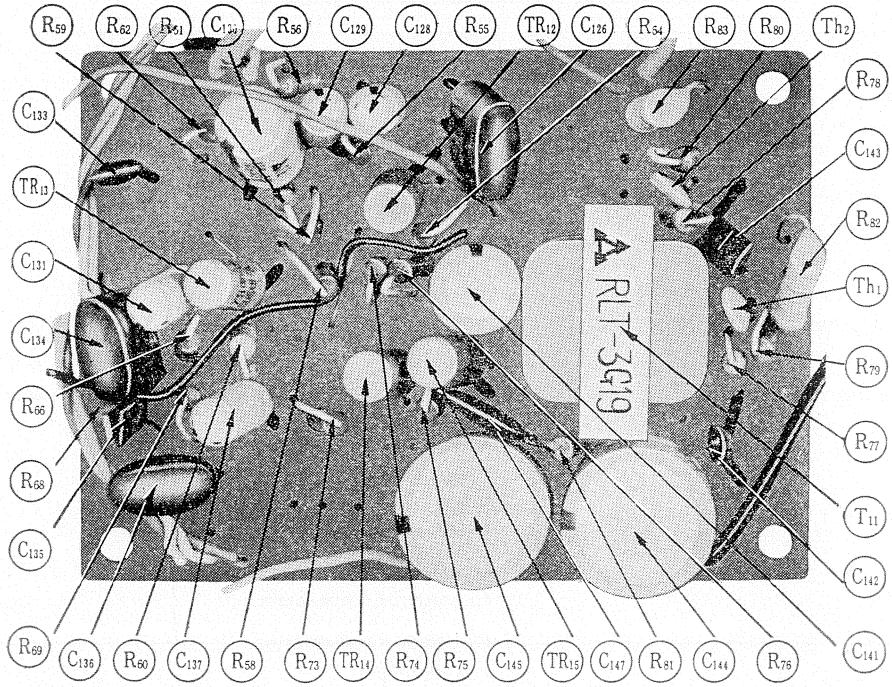
(IF Section)

Fig. 17 Component View - Parts Identification.



(IF Section)

Fig. 18 Component View - Parts Identification.



(Audio Section)

Fig. 19 Component View - Parts Identification.

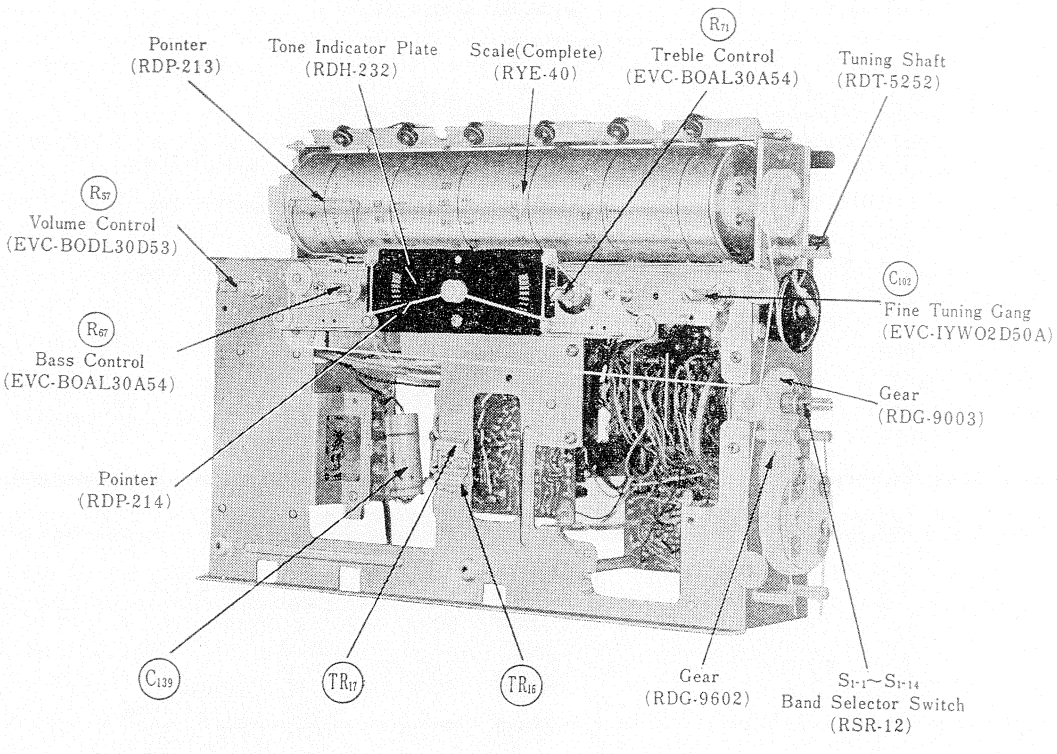


Fig. 20 Component View - Parts Identification.

MODEL RF-3000

REPLACEMENT PARTS LIST

Ref No.	Part No.	Description
		TRANSISTORS AND DIODES
TR_1	2SC429	FM RF Amplifier
TR_2	2SC469	FM Mixer
TR_3	2SC185	FM Oscillator
TR_4	2SC469	FM 1st IF Amplifier
TR_5	2SC469	FM 2nd IF Amplifier
TR_6	2SC469	FM 3rd IF Amplifier
TR_7	2SC469	FM 4th IF Amplifier
TR_8	2SC185	AM RF Amplifier
TR_9	2SC185	AM Converter
TR_{10}	2SC183	Regulator Amplifier
TR_{11}	2SB176	Regulator
TR_{12}	2SB173	1st AF Amplifier
TR_{13}	2SB173	2nd AF Amplifier
TR_{14}	2SB171	3rd AF Amplifier
TR_{15}	2SB175	4th AF Amplifier
TR_{16}	2SB324	Power Amplifier (push- pull)
TR_{17}	2SB324	
D_1	SC-15	FM AFC
D_2	OA70	FM AGC
D_3	OA79	FM Detector
D_4	OA79	
D_5	1S1211	Operation Compensator
D_6	1S1211	
D_7	1S1211	Operation Compensator
D_8	1S1211	
D_9	OA70	AM D. AGC
		INTEGRATED CIRCUITS
IC_1	EXM-0515XA	AM IF Amplifier
IC_2	EXM-0515XB	AM Detector & AGC
		THERMISTORS
Th_1	MT-080	Operation Compensator
Th_2	MT-080	Operation Compensator
		CAPACITORS
C_1	ECC-L5180K	18PF, ±10%, Ceramic
C_2	ECC-D05020C	2PF, ±0.25PF, Ceramic
C_3	ECC-D05180K	18PF, ±10%, Ceramic
C_4	ECK-D5102P	0.001μF, 500WV, +100%, −0%, Ceramic Disc
C_5	ECK-D5102P	0.001μF, 500WV, +100%, −0%, Ceramic Disc
C_6	ECC-D05180K	18PF, ±10%, Ceramic
C_7	ECK-D05222P	0.0022μF, 50 WV, +100%, −0%, Ceramic Disc
C_8	ECC-D05030C	3PF, ±0.25PF, Ceramic
C_9	ECC-D05070D	7PF, ±0.5PF, Ceramic
C_{10}	ECV-1ZW10P12	Trimmer, FM Collector
$C_{11, 12, 14}$	PVC-3D20	Tuning Gang, FM
C_{13}	ECV-1ZW10P12	Trimmer, FM Detector
C_{15}	ECV-1ZW10P12	Trimmer, FM Oscillator
C_{16}	ECC-D05040C	4PF, ±0.25PF, Ceramic
C_{17}	ECC-D05070D	7PF, ±0.5PF, Ceramic
C_{18}	ECC-D05010C	1PF, ±0.25PF, Ceramic
C_{19}	ECC-U05331K	330PF, ±10%, Ceramic
C_{20}	ECC-D05050C	5PF, ±0.25PF, Ceramic
C_{21}	ECC-D05050C	5PF, ±0.25PF, Ceramic
C_{22}	ECC-D05150K	15PF, ±10%, Ceramic
C_{23}	ECK-D05103P	0.01μF, 50WV, +100%, −0%, Ceramic Disc
C_{24}	ECK-D05223P	0.022μF, 50WV, +100%, −0%, Ceramic Disc
C_{25}	ECC-D05010C	1PF, ±0.25PF, Ceramic
C_{26}	ECK-L5102Z	0.001μF, 500WV, +80% −20% Ceramic (Cylinder Type)
C_{27}	ECK-L5102Z	0.001μF, 500WV, +80% −20% Ceramic (Cylinder Type)
C_{28}	ECK-L5102Z	0.001μF, 500WV, +80% −20% Ceramic (Cylinder Type)

Ref No.	Part No.	Description
		CAPACITORS
C_{29}	ECK-L5102Z	0.001μF, 500WV, +80% Ceramic −20% (Cylinder Type)
C_{30}	ECC-L5470K	47PF, ±10%, Ceramic
C_{32}	ECE-A25V1	1μF, 25WV, Electrolytic
C_{33}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{34}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{35}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{36}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{37}	ECE-A6V200	200μF, 6 WV, Electrolytic
C_{38}	ECK-D05103M-Y	0.01μF, 50WV, ± 20%, Ceramic Disc
C_{39}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{40}	ECQ-S02152KZ	1500PF, ±10%, Styrol
C_{41}	ECC-D05020C	2PF, ±0.25PF, Ceramic
C_{42}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{43}	ECQ-S1201JZ	200PF, ±5%, Styrol
C_{44}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{45}	ECC-D05030C	3PF, ±0.25PF, Ceramic
C_{46}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{47}	ECE-A6V10	10μF, 6 WV, Electrolytic
C_{48}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{49}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{50}	ECC-D052R5C	2.5PF, ±0.25PF, Ceramic
C_{51}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{52}	ECQ-S02152KZ	1500PF, ±10%, Styrol
C_{53}	ECE-A6V200	200μF, 6WV, Electrolytic
C_{54}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{55}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{56}	ECC-D05020C	2PF, ±0.25PF, Ceramic
C_{57}	ECC-D05470K	47PF, ±10%, Ceramic
C_{58}	ECC-U05331K	330PF, ±10%, Ceramic
C_{59}	ECC-U05331K	330PF, ±10%, Ceramic
C_{60}	ECC-U05331K	330PF, ±10%, Ceramic
C_{61}	ECK-D05223P	0.022μF, 50WV, +100%, Ceramic Disc − 0%,
C_{62}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{63}	ECE-A25V1	1μF, 25WV, Electrolytic
C_{64}	ECE-B10V5	5μF, 10WV, Electrolytic
C_{65}	ECE-A25V1	1μF, 25WV, Electrolytic
C_{66}	ECK-D05103P	0.01μF, 50WV, +100%, Ceramic Disc − 0%,
C_{67}	ECK-D05472M-Y	0.0047μF, 50WV, ± 20%, Ceramic Disc
$C_{71, 86, 101}$	PVC-3RA	Tuning Gang, AM
C_{72}	ECC-D05020C	2PF, ±0.25PF, Ceramic
C_{73}	ECC-D05020C	2PF, ±0.25PF, Ceramic
C_{74}	ECC-D05050C	5PF, ±0.25PF, Ceramic
C_{75}	ECC-D05150K	15PF, ±10%, Ceramic
C_{76}	ECC-D05220K	22PF, ±10%, Ceramic
C_{77}	ECC-D05220K	22PF, ±10%, Ceramic
C_{78}	ECQ-S1471J	470PF, ±5 %, Styrol
C_{79}	ECC-D05220K	22PF, ±10%, Ceramic
C_{80}	ECV-1ZW20P12	Trimmer, LW Antenna
$C_{81\sim84}$	ECV-4RW12W13	Trimmer, AM, MB, SW_1 & SW_2 Antenna
C_{85}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{87}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{88}	ECK-D05332M-Y	0.0033μF, 50WV, ±20%, Ceramic Disc
C_{89}	ECC-D05050C	5PF, ±0.25PF, Ceramic
C_{90}	ECC-D05180K	18PF, ±10%, Ceramic
C_{91}	ECC-D05220K	22PF, ±10%, Ceramic
$C_{92, 96\sim98}$	ECV-4RW12W13	Trimmer, AM, MB, SW_1 & SW_2 Detector
C_{93}	ECQ-S1471J	470PF, ± 5%, Styrol
C_{94}	ECC-D05270K	27PF, ±10%, Ceramic
C_{95}	ECC-D05270K	27PF, ±10%, Ceramic
C_{99}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{100}	ECK-D05333P	0.033μF, 50WV, +100%, Ceramic Disc − 0%,

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Ref. No.	Part No.	Description
		CAPACITORS
C_{102}	ECV-1YW02D50A	Fine Tuning Gang
C_{103}	ECQ-S1151J	150PF, ±5%, Styrol
C_{104}	ECQ-M05223MZ	0.022μF, 50WV, ±20%, Polyester
C_{105}	ECQ-S1361J	360PF, ±5%, Styrol
C_{106}	ECC-D05070K	7PF, ±10%, Ceramic
C_{107}	ECQ-S02122K	1200PF, ±10%, Styrol
C_{108}	ECC-D05150K	15PF, ±10%, Ceramic
C_{109}	ECQ-S02472K	4700PF, ±10%, Styrol
C_{110}	ECC-D05180K	18PF, ±10%, Ceramic
C_{111}	ECQ-S1471J	470PF, ±5%, Styrol
C_{112}	ECC-D05180K	18PF, ±10% Ceramic
C_{113}	ECV-1ZW20P12	Trimmer, LW Oscillator
C_{114}～$_{117}$	ECV-4RW12W13	Trimmer, AM, MB, SW_1 & SW_2 Oscillator
C_{118}	ECC-D05390K	39PF, ±10%, Ceramic
C_{119}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{120}	ECK-D05472M-Y	0.0047μF, 50WV, ±20%, Ceramic Disc
C_{121}	ECK-D05472M-Y	0.0047μF, 50WV, ±20%, Ceramic Disc
C_{122}	ECK-D05472M-Y	0.0047μF, 50WV, ±20%, Ceramic Disc
C_{123}	ECC-D05220K	22PF, ±10%, Ceramic
C_{124}	ECK-D05103M-Y	0.01μF, 50WV, ±20%, Ceramic Disc
C_{126}	ECQ-M05104MZ	0.1μF, 50WV, ±20%, Polyester
C_{127}	ECE-A6V30	30μF, 6 WV, Electrolytic
C_{128}	ECE-A25V1	1μF, 25WV, Electrolytic
C_{129}	ECE-A25V1	1μF, 25WV, Electrolytic
C_{130}	ECE-A6V100	100μF, 6 WV, Electrolytic
C_{131}	ECE-A25V1	1μF, 25WV, Electrolytic
C_{132}	ECE-A6V200	200μF, 6 WV, Electrolytic
C_{133}	ECQ-M05103MZ	0.01μF, 50WV, ±20%, Polyester
C_{134}	ECQ-M05104MZ	0.1μF, 50WV, ±20%, Polyester
C_{135}	ECQ-M05152MZ	0.0015μF, 50WV, ±20%, Polyester
C_{136}	ECQ-M05104MZ	0.1μF, 50WV, ±20%, Polyester
C_{137}	ECE-A25V1	1μF, 25WV, Electrolytic
C_{138}	ECE-A6V500	500μF, 6 WV, Electrolytic
C_{139}	ECE-B15V1000	1000μF, 15WV, Electrolytic
C_{141}	ECE-A6V200	200μF, 6 WV, Electrolytic
C_{142}	ECQ-M05152MZ	0.0015μF, 50WV, ±20%, Polyester
C_{143}	ECQ-M05152MZ	0.0015μF, 50WV, ±20%, Polyester
C_{144}	ECE-A10V500	500μF, 10WV, Electrolytic
C_{145}	ECE-A10V500	500μF, 10WV, Electrolytic
C_{146}	ECC-U05331K	330PF, ±10%, Ceramic
C_{147}	ECQ-M05153MZ	0.015μF, 50WV, ±20%, Polyester
		RESISTORS
R_1	ERD-14VK822	8.2KΩ, ¼Watt, ±10%, Carbon
R_2	ERD-14VK181	180Ω, ¼Watt, ±10%, Carbon
R_3	ERD-14VK222	2.2KΩ, ¼Watt, ±10%, Carbon
R_4	ERD-14VK272	2.7KΩ, ¼Watt, ±10%, Carbon
R_5	ERD-14VK103	10KΩ, ¼Watt, ±10%, Carbon
R_6	ERD-14VK272	2.7KΩ, ¼Watt, ±10%, Carbon
R_7	ERD-14TK104	100KΩ, ¼Watt, ±10%, Carbon
R_8	ERD-14TK821	820Ω, ¼Watt, ±10%, Carbon
R_9	ERD-14VK104	100KΩ, ¼Watt, ±10%, Carbon
R_{10}	ERD-14TK101	100Ω, ¼Watt, ±10%, Carbon
R_{11}	ERD-14VK821	820Ω, ¼Watt, ±10%, Carbon
R_{12}	ERD-14VK222	2.2KΩ, ¼Watt, ±10%, Carbon
R_{13}	ERD-14VK472	4.7KΩ, ¼Watt, ±10%, Carbon
R_{14}	ERD-14VK221	220Ω, ¼Watt, ±10%, Carbon
R_{15}	ERD-14VK391	390Ω, ¼Watt, ±10%, Carbon
R_{16}	ERD-14VK101	100Ω, ¼Watt, ±10%, Carbon
R_{17}	ERD-14VK182	1.8KΩ, ¼Watt, ±10%, Carbon
R_{18}	ERD-14VK330	33Ω, ¼Watt, ±10%, Carbon
R_{19}	ERD-14VK561	560Ω, ¼Watt, ±10%, Carbon
R_{20}	ERD-14VK393	39KΩ, ¼Watt, ±10%, Carbon
R_{21}	ERD-14VK101	100Ω, ¼Watt, ±10%, Carbon
R_{22}	ERD-14VK182	1.8KΩ, ¼Watt, ±10%, Carbon
R_{23}	ERD-14VK561	560Ω, ¼Watt, ±10%, Carbon
R_{24}	ERD-14VK221	220Ω, ¼Watt, ±10%, Carbon
R_{25}	ERD-14VK122	1.2KΩ, ¼Watt, ±10%, Carbon
R_{26}	ERD-14VK331	330Ω, ¼Watt, ±10%, Carbon
R_{27}	ERD-14VK102	1KΩ, ¼Watt, ±10%, Carbon
R_{28}	ERD-14VK102	1KΩ, ¼Watt, ±10%, Carbon
R_{29}	ERD-14TK472	4.7KΩ, ¼Watt, ±10%, Carbon
R_{30}	ERD-14VK122	1.2KΩ, ¼Watt, ±10%, Carbon
R_{31}	ERD-14VK472	4.7KΩ, ¼Watt, ±10%, Carbon
R_{32}	ERD-14VK472	4.7KΩ, ¼Watt, ±10%, Carbon

Ref. No.	Part No.	Description
		RESISTORS
R_{33}	ERD-14VK224	220KΩ, ¼Watt, ±10%, Carbon
R_{34}	ERD-14VK122	1.2KΩ, ¼Watt, ±10%, Carbon
R_{35}	EVL-TOAAOOB24	20KΩ (B), Indicator Control (FM)
R_{36}	ERD-14VK474	470KΩ, ¼Watt, ±10%, Carbon
R_{37}	ERD-14TK823	82KΩ, ¼Watt, ±10%, Carbon
R_{38}	ERD-14VK563	56KΩ, ¼Watt, ±10%, Carbon
R_{39}	ERD-14VK104	100KΩ, ¼Watt, ±10%, Carbon
R_{40}	ERD-14VK122	1.2KΩ, ¼Watt, ±10%, Carbon
R_{41}	ERD-14VK101	100Ω, ¼Watt, ±10%, Carbon
R_{42}	ERD-14VK222	2.2KΩ, ¼Watt, ±10%, Carbon
R_{43}	EVL-TOAAOOB13	1KΩ (B), Indicator Control (AM)
R_{44}	ERD-14VK102	1KΩ, ¼Watt, ±10%, Carbon
R_{45}	ERD-14VK562	5.6KΩ, ¼Watt, ±10%, Carbon
R_{46}	ERD-14VK122	1.2KΩ, ¼Watt, ±10%, Carbon
R_{47}	ERD-14TK392	3.9KΩ, ¼Watt, ±10%, Carbon
R_{48}	ERD-14VK101	100Ω, ¼Watt, ±10%, Carbon
R_{49}	ERD-14TK681	680Ω, ¼Watt, ±10%, Carbon
R_{50}	ERD-14VK220	22Ω, ¼Watt, ±10%, Carbon
R_{51}	ERD-14VK181	180Ω, ¼Watt, ±10%, Carbon
R_{52}	ERD-14VK331	330Ω, ¼Watt, ±10%, Carbon
R_{53}	ERD-14TK272	2.7KΩ, ¼Watt, ±10%, Carbon
R_{54}	ERD-14VK334	330KΩ, ¼Watt, ±10%, Carbon
R_{55}	ERD-14VK822	8.2KΩ ¼Watt, ±10%, Carbon
R_{56}	ERD-14VK122	1.2KΩ ¼Watt, ±10%, Carbon
R_{57}	EVC-BODL30D53	5KΩ(D), Volume Control W/ON-OFF Switch (S_3)
R_{58}	ERD-14VK473	47KΩ, ¼Watt, ±10%, Carbon
R_{59}	ERD-14VK103	10KΩ, ¼Watt, ±10%, Carbon
R_{60}	ERD-14VK472	4.7KΩ, ¼Watt, ±10%, Carbon
R_{61}	ERD-14VK182	1.8KΩ, ¼Watt, ±10%, Carbon
R_{62}	ERD-14VK470	47Ω, ¼Watt, ±10%, Carbon
R_{63}	ERD-14VK331	330Ω, ¼Watt, ±10%, Carbon
R_{64}	ERD-14VK272	2.7KΩ, ¼Watt, ±10%, Carbon
R_{65}	EVL-TOAAOOB13	1KΩ(B), Bias Voltage Control
R_{66}	ERD-14VK103	10KΩ, ¼Watt, ±10%, Carbon
R_{67}	EVC-BOAL30A54	50KΩ(A), Bass Control
R_{68}	ERD-14VK102	1KΩ, ¼Watt, ±10%, Carbon
R_{69}	ERD-14VK103	10KΩ, ¼Watt, ±10%, Carbon
R_{70}	ERD-14VK331	330Ω, ¼Watt, ±10%, Carbon
R_{71}	EVC-BOAL30A45	50KΩ(A), Treble Control
R_{72}	ERD-14VK332	3.3KΩ, ¼Watt, ±10%, Carbon
R_{73}	ERD-14VK823	82KΩ, ¼Watt, ±10%, Carbon
R_{74}	ERD-14VK473	47KΩ, ¼Watt, ±10%, Carbon
R_{75}	ERD-14VK392	3.9KΩ, ¼Watt, ±10%, Carbon
R_{76}	ERD-14VK271	270Ω, ¼Watt, ±10%, Carbon
R_{77}	ERD-14VK152	1.5KΩ, ¼Watt, ±10%, Carbon
R_{78}	ERD-14VK152	1.5KΩ, ¼Watt, ±10%, Carbon
R_{79}	ERD-14VK121	120Ω, ¼Watt, ±10%, Carbon
R_{80}	ERD-14VK121	120Ω, ¼Watt, ±10%, Carbon
R_{81}	ERD-14TK273	27KΩ, ¼Watt, ±10%, Carbon
R_{82}	ERW-12LKR47	0.47Ω, ½Watt, ±10%, Wire
R_{83}	ERW-12LKR47	0.47Ω, ½Watt, ±10%, Wire
R_{91}	ERD-14VK470	47Ω, ¼Watt, ±10%, Carbon
R_{92}	ERD-14VK221	220Ω, ¼Watt, ±10%, Carbon
R_{93}	ERD-14VK221	220Ω, ¼Watt, ±10%, Carbon
R_{94}	ERD-14TK472	4.7KΩ, ¼Watt, ±10%, Carbon
R_{95}	ERD-14TK101	100Ω, ¼Watt, ±10%, Carbon
R_{96}	ERD-14VK562	5.6KΩ, ¼Watt, ±10%, Carbon
R_{97}	ERD-14TK472	4.7KΩ, ¼Watt, ±10%, Carbon
		COILS AND TRANSFORMERS
L_1	RLQ-Y25S-2	FM Choke Coil
L_2	RLQ-Y11G-1	FM Choke Coil
L_3	RLQ-Y25S-2	FM Antenna Coil
L_4	RLD-4N7	FM Detector Coil
L_5	RLD-4N4	FM Detector Coil
L_6	RLD-4010	FM Oscillator Coil
L_7	RLQ-Y72S-1	FM Coupling Choke Coil
L_8, L_9	RLF-6H3	LW, AM Antenna Coil
L_{10}, L_{11}	RLF-3H1	MB, SW_1 Antenna Coil
L_{12}	RLA-3P24	SW_2 Antenna Coil
L_{13}	RLD-2P2	AM Detector Coil
L_{14}	RLD-3P5	MB Detector Coil
L_{15}	RLD-3P6	SW_1 Detector Coil
L_{16}	RLD-3P7	SW_2 Detector Coil
L_{17}	RLO-1P14	LW Oscillator Coil
L_{18}	RLO-2P54	AM Oscillator Coil
L_{19}	RLO-3P83	MB Oscillator Coil

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Ref. No.	Part No.	Description
		COILS AND TRANSFORMERS
L_{20}	RLO-3P84	SW_1 Oscillator Coil
L_{21}	RLO-3P85	SW_2 Oscillator Coil
L_{22}	RLQ-X121-1	Choke Coil
T_1	RLI-4B113-T	FM 1st IF Transformer, Primary
T_2	RLI-4B351-T	FM 1st IF Transformer, Secondary
T_3	RLI-4C204	FM 2nd IF Transformer, Primary
T_4	RLI-4C204	FM 2nd IF Transformer, Secondary
T_5	RLI-4C204	FM 3rd IF Transformer,
T_6	RLI-4C204	FM 4th IF Transformer
T_7	RLI-4C506	FM 5th IF Transformer, Primary
T_8	RLI-4C507	FM 5th IF Transformer, Secondary
T_9	RLI-2B117	AM 1st IF Transformer
T_{10}	RLI-2C256-M	AM 2nd IF Transformer
T_{11}	RLT-3G19	Input Transformer
C. F	EFC-D455K5	Ceramic Filter
		SPEAKERS AND EARPHONE
SP_1	EAS-12P16SE	12cm (5″) PM Dynamic Speaker
SP_2	EAS-10P70SB	10cm (4″) PM Dynamic Speaker
EP	EAE-1TB	Magnetic Earphone
		SWITCHES
S_{1-1}～$_{1-14}$	RSR-12	Band Selector Switch
S_2	RSS-91	AFC Switch
S_4	RSH-6-2	Dial Light Switch
		MISCELLANEOUS
	RVL-408	Neon Lamp, Arrester, 0.3A
	RVL-207	Dial Light, 6V 0.04A (3 Req'd)
	RVL-207-3	Dial Light, 6V 0.04A (3 Req'd)
	RJP-3-1	Plug, Phono & Recorder (2 Req'd)
	RJJ-13-1	Jack, Phono
	RJJ-25	Jack, MPX OUT, Stereo Input Recorder & Earphone
	RJT-318	Terminal, Whip Antenna
	RJF-3407-1	Jack, EXT FM, AM Antenna & Ground
	RJF-3107	Jack, EXT FM Antenna
	RJF-3306	Socket, Battery
	RKE-84	Cover, AC-DC Selector Switch
	RGK-487	Indicating Plate, AC-BATT Mark
	RJP-4-1	Plug, Power Source
	RJC-102	Terminal, Battery (2 Req'd)
	RJC-502	Spring, Battery (2 Req'd)
	RMA-246	Bracket, Core Antenna
	RMS-10	Bracket, Speaker (2 Req'd)
	RMM-19	Bracket, Tuning Indicator (2 Req'd)
	RMY-22	Heat Sink, Transistor (TR_{16} & TR_{17})
	RMY-1-3	Heat Sink, Transistor (TR_{11})
	RDT-5252	Shaft, Tuning
	RDX-804	Shaft, Drum (RDD-3050)
	RDX-602-2	Shaft, Tone Indicator, Large (2 Req'd)
	RDD-3050-1	Drum, Band Selector
	RDD-36-1	Drum, Dial, Black (2 Req'd)
	RDD-28-3	Drum, Dial, White (2 Req'd)
	RDR-8	Pulley, Dial Cord, Large (5 Req'd)
	RDR-14	Pulley, Dial Cord, Small (2 Req'd)
	RDY-2	Shaft, Pulley, Long (6 Req'd)
	RDY-4	Shaft, Pulley, Short (2 Req'd)
	RDG-9003	Gear, Band Selector (with shaft)
	RDG-9602	Gear, Band Selector
	RDE-3	Shaft, Tone Indicator, Small (4 Req'd)
	RDE-41	Shaft, Gear (RDG-9602)
	RDH-232	Plate, Tone Indicator
	RDS-205	Spring, Tone Indicator (2 Req'd)
	RDS-309	Spring, Band Selector
	RDS-409	Spring, Dial (2 Req'd)
	RDZ-05-3	Cord, Tone Indicator & Dial, 190cm (75″)
	RDZ-07-1	Cord, Band Selector, 140cm (55⅛″)
	RGK-9010	Indicating Plate, Volume Control
	⊕B3-6V	Screw, Jack (RJF-3407) M'tg. (3 Req'd)
	⊕B3-8V	Screw, Handle M'tg. (2 Req'd)
	⊕B3-8N	Screw, Cabinet Back Cover M'tg. (6 Req'd)
	DSTR3-10R	Red Screw, Chassis M'tg. (6 Req'd)
	L3-5.5	Screw, Dial Drum (RDD-28-3) & Gear (RDG-9003) M'tg. (4 Req'd)

Ref. No.	Part No.	Description
		MISCELLANEOUS
	RNE-213	Screw, Shaft (RDX-602-2) M'tg. (2 Req'd)
	RNW-424	Washer, Tone Indicator (3 Req'd)
	RHG-5-1	Rubber Cushion, FM RF P.C. Board M'tg. (3 Req'd)
	RHG-202	Rubber Cushion, Dial Light (6 Req'd)
		APPEARANCE
	RYA-2532	Cabinet (Complete)
	RKM-1960	Cabinet Only, Plastic
	RYF-351	Cover (Complete), Cabinet Back
	RKF-1551	Cover Only, Cabinet Back
	RYF-361	Cover (Complete), Cabinet Front
	RKF-1581	Cover Only, Cabinet Front
	RKK-300	Cover Only, Battery Compartment
	RYN-190	Cover (Complete), AC Cord Box
	RKK-290	Cover Only, AC Cord Box
	RKF-1560	Cover Only, Right Side of Cabinet
	RKF-1570	Cover Only, Left Side of Cabinet
	RJK-1604	Case, Battery
	RKH-5010	Handle, Cabinet
	RKT-22	Bracket, Handle
	RYE-40	Scale (Complete)
	RGE-9001-2	Time table
	RGE-55	World Time Map
	RGP-1930	Panel, Dial
	RGM-1700	Metal Grille
	RGB-319	Badge, NATIONAL PANASONIC Mark, Cabinet Front Cover
	RGB-334	Badge, RF-3000 Mark, Cabinet Front Cover
	RGB-318	Badge, NATIONAL PANASONIC Mark
	RGT-1043	Name Plate
	RGX-422	Ornament, Lower Side of Metal Grille
	RGX-423	Ornament, Upper Side of Metal Grille
	RGX-424	Ornament, Upper Side of Cabinet
	RGX-425	Ornament, Right Side of Cabinet
	RGX-426	Ornament, Left Side of Cabinet
	RGX-426	Ornament, Indicator Mark
	RGK-273	Indicating Plate, LIGHT & AFC Mark
	RGK-279	Indicating Plate, MPX, AM ANT, REC OUT & PHONO Mark
	RGK-280	Indicating Plate, EARPHONE & FM ANT Mark
	RBN-192	Knob, Volume, Bass, Treble & Fine Tuning
	RBS-40	Knob, Band Selector
	RBT-129	Knob, Tuning
	RHG-305-3	Stand, Cabinet (4 Req'd)
	RDP-213	Pointer, Dial
	RDP-214	Pointer, Tone Indicator (2 Req'd)
	RUV-244-1	Box, AC Cord
	RMA-194	Bracket, Frame Antenna, Small (2 Req'd)
	RMA-195	Bracket, Frame Antenna, Large (2 Req'd)
	RSA-26	Frame Antenna
	RANT145-7TA	Whip Antenna
	R-111DB	Tuning Indicator

MODEL RF-3000

AC ADAPTOR

MODEL RD-9430

FOR RADIO MODEL RF-3000

SPECIFICATIONS

Input Voltage:	AC 50 or 60c/s 110V/200V/225V/250V
Output Voltage:	DC 9V
Maximum Current:	300mA
Power Consumption:	7W
Dimensions:	60(Wide)×70(High)×71(Deep)mm ($2\frac{11}{32}$″×$2\frac{3}{4}$″×$2\frac{13}{16}$″)
Weight:	700g. ($1\frac{1}{2}$ lb.)

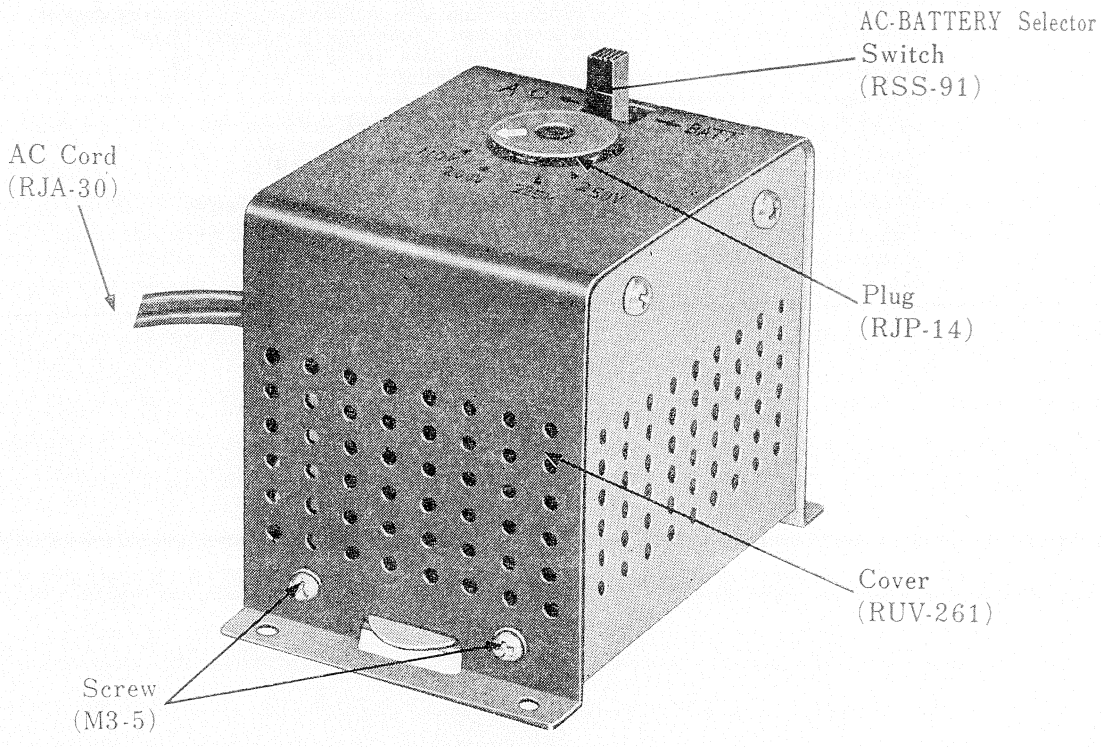
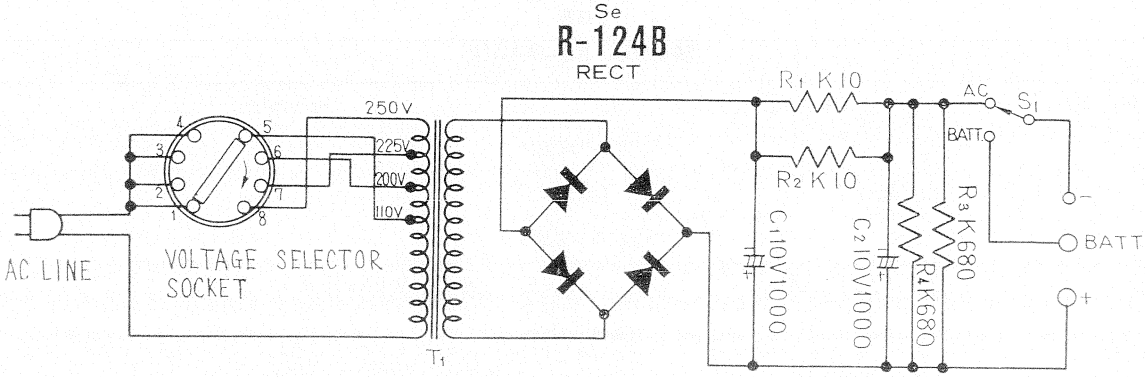


Fig. 21 Appearance - Parts Identification.



1. S_1 : AC-BATTERY selector switch in "AC" position.
2. Tolerance Mark.
   K=±10%
3. All resistor values in ohms (K=10000Ω).
4. All capacitor values in micro farads (P=μμF).

Fig. 22 Schematic Diagram.

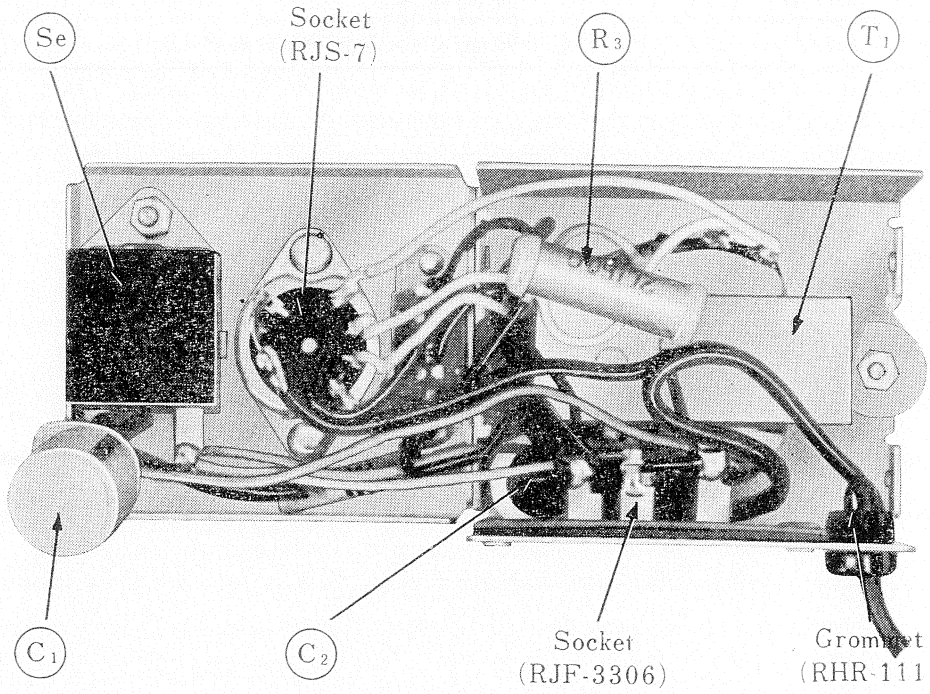


Fig. 23 Component View - Parts Identification.

MODEL RF-3000

REPLACEMENT PARTS LIST

AC ADAPTOR
FOR
MODEL RD-9430

Ref. No.	Rart No.	Description
		SELENIUM
Se	R-204B	Rectifier
		CAPACITORS
C_1, C_2	ECE-A10V1000H	1000μF, 10WV, Electrolytic
		RESISTORS
R_1, R_2 R_3, R_4	ERD-14TK100 ERD-14TK681	10Ω, $\frac{1}{4}$Watt, $\pm$10%, Carbon 680Ω, $\frac{1}{4}$Watt, $\pm$10%, Carbon
		TRANSFORMER
T_1	RLT-5K11	Power Transformer
		SWITCH
S_1	RSS-91	AC-BATTERY Selector Switch
		APPEARANCE & MISCELLANEOUS
	RJP-4-1 RJP-14 RJP-58 or RJP-62 RJP-9014 RUV-15-1 RJS-7 RJA-30 RJF-3306 RUV-261 RHR-111 M3-5	Plug, Power Source Plug, Voltage Selector Plug, AC Cord Plug, EXT Power Source Cover, AC-BATTERY Selector Switch Socket, Voltage Selector AC Cord, Power Source Socket, Power Source Cover, Adaptor Grommet, AC Cord Screw, Cover M'tg. (RUV-261)

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